

NON-PUBLIC?: N

ACCESSION #: 9307060249

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Grand Gulf Nuclear Station PAGE: 1 OF 4

DOCKET NUMBER: 05000416

TITLE: Reactor Scram Due to Low Primary Water Tank Level Signal

EVENT DATE: 08/04/92 LER #: 92-017-02 REPORT DATE: 06/30/93

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10
CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Riley Ruffin/Licensing Specialist TELEPHONE: (601) 437-2167

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

On August 4, 1992, the reactor scrambled due to a fast closure of the main turbine stop valves. The fast closure of the stop valves occurred as a

result of a main generator trip which was caused by a low primary cooling water tank level signal. The erroneous signal was generated due to perturbations in the Primary Water level sensing circuitry. The perturbations in the Primary Water level sensing circuit was caused by the operation of a 24 Vdc battery ground detection circuit. Tests performed during the investigation confirmed that noise spikes were generated on the Primary Water level instrument loop upon operation of this battery's ground detection circuit. Following the scram, vessel level decreased to approximately 1 inch, which is approximately 167 inches above the top of active fuel. Steam dome pressure increased to approximately 1111 pounds per square inch. Two main steam safety relief valves operated to relieve vessel pressure. Level was restored to approximately 47 inches by the feedwater system. This event did not compromise the safety of the public.

END OF ABSTRACT

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A. Reportable Occurrence

On August 4, 1992, a valid Reactor Protection System (RPS) JC! actuation occurred which resulted in a reactor scram. The actuation signal was generated due to a fast closure of the main turbine stop valves. The occurrence is being reported pursuant to 10 CFR 50.73(a)(2)(iv).

B. Initial Conditions

The plant was in Operating Condition 1, with reactor power at 100

percent. Two licensed operator trainees were in the vicinity of the 11DH distribution panel and had observed a ground on the bus when the ground detection push button was depressed. The ground was observed at approximately the same time as the occurrence.

C. Description of Occurrence

On August 4, 1992, two trainees were in the plant to review a "Three Wire" battery system. The trainees entered the J and H (24 Vdc) battery room with the intention to perform a ground check on the system.

Upon reaching the 11DH distribution panel, the trainees verified all voltage indications were indicating normal values. This was in accordance with approved plant procedures. With the ground transfer switch in position 1, the ground test was performed and no abnormal readings were observed. However when the ground test was performed with the ground transfer switch in position 2, a ground was observed. At this time, control room personnel observed several alarms associated with the Electronic Generator Protection (EGP), along with the reactor scram annunciator.

DC Bus 11DH provides power to the EGP cabinet 1H13P829/JC09 which provides power to the primary water (PW) TJ! tank level switches 1N43N104 and 1N43N105. Performing the ground detection test on the 11DH bus caused perturbations in the level sensing circuitry and resulted in a low primary water tank level signal. The low water level signal caused a turbine trip which resulted in reactor scram due to fast closure of the main turbine stop valves.

Following the scram, reactor vessel level decreased to approximately 1 inch (167 inches above TAF), as indicated by the General Electric Transient Analysis Recorder.

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Steam dome pressure increased to approximately 1111 pounds per square inch during the occurrence. Two main steam safety relief valves operated to relieve vessel pressure. Vessel water level was restored by the feedwater system SJ! to approximately 47 inches. The plant was stabilized in accordance with plant procedures.

A temporary modification was installed to bypass the low PW tank level generator trip until an investigation could be performed and corrective actions taken.

D. Apparent Cause

The cause of the RPS actuation was determined to be an inadvertent low PW tank water level signal that resulted in a main generator trip.

A subsequent investigation revealed the following:

The PW tank level pre-amp probe is a capacitor probe that is referenced to the PW tank, which is grounded. The water in the tank acts as a dielectric for this capacitor. As the water level changes, the capacitance of this probe also changes which generates a corresponding level signal.

The ground detection circuit for the ungrounded 24 Vdc battery, 11 D H, is designed with a switchable high resistance path to ground from the battery's three poles. The high resistance ground supports the function of the ground detection circuit. As a result of both the pre-amp capacitor probe and the battery's ground detection circuit referenced to ground, there exist a high resistance ground loop between the PW tank level pre-amp capacitor probe and battery 11DH.

During Refueling Outage Five, the original level transmitters were replaced. Due to the original transmitters experiencing drift problems and being obsolete, vendor recommended replacement transmitters were installed. The original transmitters employed DC to DC converters on their input. This DC to DC converter provided isolation between the grounded PW tank level capacitor probe and the designed ground on the battery's ground detection circuit.

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Therefore operation of the ground detection circuit, prior to replacement of the original transmitters, did not affect the PW level pre-amp circuit.

The newly installed transmitters do not use a DC to DC converter on their input. Therefore, the designed ground on the battery's ground detect circuit is not isolated from the grounded PW tank level pre-amp probe which creates a ground loop, of which the PW level pre-amp circuit is within. The operation of the ground detection circuit "opens" and "closes" this ground loop and caused perturbations in the pre-amp circuit which resulted in the

generation of a false low level signal. Tests performed during the investigation confirmed that noise spikes are generated on the level instrument loop upon disturbance of this ground loop.

E. Supplemental Corrective Action

A Minor Change Package (MCP) is scheduled to be implemented during the next refueling outage. This MCP will install a DC to DC converter between the 24 Vdc power supply and the PW tank level transmitters. This will provide isolation between the pre-amp probe and the ground on the battery's ground detection circuit; therefore eliminating disturbances on the reference of the capacitor probe's pre-amp due to operation of the battery's ground detection circuit.

Appropriate design personnel will be informed that change packages, which require DC components to be procured, will contain an appropriate description of the GGNS as-built DC system as needed to ensure proper component operation.

F. Safety Assessment

The occurrence did not compromise the safety of the public at anytime. The actuation of RPS did not inhibit the function of any safety systems or components. Proper operation was observed for all required safety systems during this event. Following the scram, vessel level decreased to a minimum of 1 inch as indicated by the General Electric Transient Analysis Recorder System. This level was approximately 167 inches above the top of active fuel.

G. Additional Information

Energy Industry Identification System (EIIIS) codes are identified in the text within brackets !.

ATTACHMENT 1 TO 9307060249 PAGE 1 OF 1

ENTERGY Entergy Operations, Inc.

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Port Gibson, MS 39150

Tel 601 437 2800

June 30, 1993 C. R. Hutchinson

Vice President

Operations

Grand Gulf Nuclear Station

U.S. Nuclear Regulatory Commission

Mail Station P1-137

Washington, D.C. 20555

Attention: Document Control Desk

SUBJECT: Grand Gulf Nuclear Station

Unit 1

Docket No. 50-416

License No. NPF-29

Update to Reactor Scram Due to Low Primary Water

Tank Level Signal

LER 92-017-02

GNRO-93/00080

Gentlemen:

Attached is Licensee Event Report (LER) 92-017-02 which is a final report.

Yours truly,

CRH/RR/

attachment

cc: Mr. R. H. Bernhard (w/a)

Mr. H. W. Keiser (w/a)

Mr. R. B. McGehee (w/a)

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